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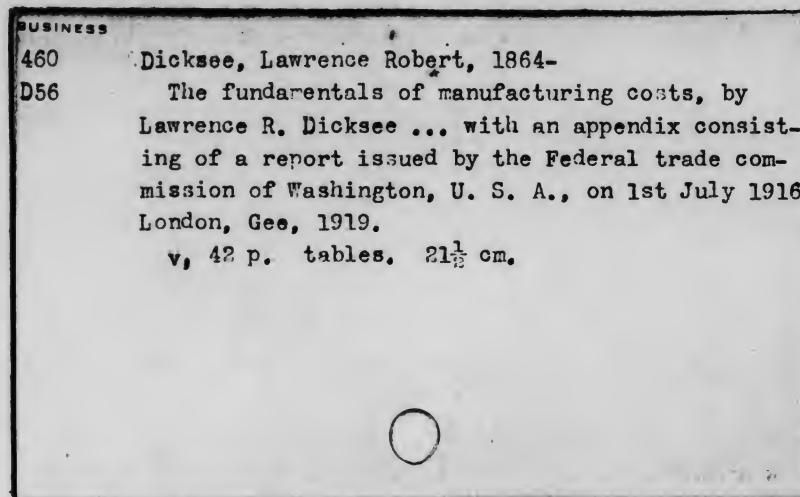
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THE FUNDAMENTALS
OF
MANUFACTURING COSTS.

BY
LAWRENCE R. DICKSEE, M.Com., F.C.A.

(Professor of Accounting and Business Organisation in the University of London).

WITH
AN APPENDIX

Consisting of a REPORT issued by the FEDERAL TRADE COMMISSION
of Washington, U.S.A., on 1st July 1916.

Price 1/6 net.

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PREFACE.

THE object of this little handbook is to draw attention to, and to emphasise the importance of, a Report issued by the Federal Trade Commission of Washington, U.S.A., on 1st July 1916, which (by the kind permission of the Chairman, Mr. Edward N. Hurley) I am able to reproduce in the form of an Appendix. I have not attempted to deal exhaustively with the subject of manufacturing costs generally, but I have endeavoured to point out that what the Federal Trade Commission is contending for in connection with the costing methods of American manufacturers applies almost equally to the manufacturers of this country, and I have added something upon the subject of the treatment of overhead charges which may prove useful in connection with that branch of costing which seems to be least understood, both in the States and here.

In the very nature of things anything like uniformity of method is impossible in connection with Cost Accounts. No "ready-made" system would satisfactorily meet the requirements of any manufacturing concern. Even in connection with the ordinary financial accounts great diversity of methods are to be found, and are necessary to meet varying circumstances. In the Cost Department such variations must necessarily be even wider, and they are, if possible, even more necessary. What I have attempted to do, accordingly, has been first to emphasise the need of accurate costing, and in the second place to endeavour to discuss those fundamental principles that must be dealt with before an adequate system can be designed to meet the requirements of any particular works. The application of principles to practice is not, in my judgment, a matter that can usefully be dealt with in any book—certainly not in a book of the size of the present volume. It is a matter upon which competent expert assistance should always be sought, and the manufacturer may rest assured that, if he proceeds upon these lines, he will in the long run be proceeding upon the most economical lines.

Further, I should like to add that no really adequate system of Cost Accounts is likely to be produced unless there is complete collaboration between the practical manufacturer on the one hand and the professional accountant upon the other. Neither can hope to produce a really satisfactory system of Cost Accounts unaided : the manufacturer, because he has had no training in accounting methods, and, naturally, does not know the best and most certain means of arriving at the results he requires ; the professional accountant, because he has no knowledge of—or at least no expert knowledge of—manufacturing processes and practical working conditions, and can only work to the best advantage when these have been properly explained to him. Failing that, he will devise a "ready-made" system that does not "fit" the actual working conditions, and is, therefore, bound to prove unworkable.

In conclusion, I should like to explain an apparent discrepancy in the text to which my attention has been drawn. Upon page 3 I have emphasised the fact that no satisfactory Cost Accounts are likely to be arrived at that are not based upon double-entry, and that no complex system is possible without the aid of sectional balancing. Elsewhere (on page 99 of my recently published book, "Office Machinery") I have referred to "the tyranny of the double-entry "idea, with its smug complacency of a low ideal "of perfection." This apparent inconsistency will cause no difficulty to those who are acquainted with my lecture on "Modern Accountancy Methods in relation to Business Efficiency," which was reproduced in *The Accountant* on the 14th November 1914, wherein I stated that "a very superficial study "of history is sufficient to show that the impression "that perfection had been achieved (if only by a "single individual) has often been responsible for "the stagnation of some art or science for a generation "or more. The fallacy of the supposed perfection "of the double-entry system, as handed down to "us by the Lombardy merchants of the fifteenth "century, is that, so to speak, it views everything "in one plane. It is about as true to nature as a "system of geometry which regards plane geometry "as the only kind in existence, and ignores the fact "that there is such a thing as solid geometry."

It may well be that, for the great majority of business events, observations on a single plane are

sufficient for practical purposes ; but it is, I think, even more certain that, being incomplete (as they necessarily are), observations that seem adequate to one generation may be found seriously inadequate to another generation of business men working under very different conditions. To recognise the twofold effect of every transaction is excellent so far as it goes, but from the point of view of modern accounting, and particularly from the point of view of Cost Accounts, mere double-entry is often an incomplete record. It is, of course, quite possible to keep accounts by double-entry, and not to keep any Cost Accounts at all. That is the kind of double-entry that I refer to when I speak of "the tyranny of the "double-entry idea with its smug complacency of "a low ideal of perfection." I am not for one moment suggesting that there is a word to be said in favour of so-called single-entry, but rather that mere double-entry is often inadequate. Sectional balancing gives us as many double-entries as there are Ledgers into which the Ledger system as a whole is subdivided, and thus enables us to review matters departmentally according to any desired basis of classification, as well as from the point of view of their effect upon the annual accounts of the undertaking.

LAWRENCE R. DICKSEE.

Lincoln House, London, W.C.1.

10th October 1917.

BY THE SAME AUTHOR.

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THE FUNDAMENTALS OF
MANUFACTURING COSTS.

So far as I can gather, there seems to be a somewhat widespread belief that Cost Accounts were invented in the United States, and introduced into this country by Sir S. H. Lever, K.C.B., when he came over to place himself at the disposal of the Ministry of Munitions. This impression is about as reliable as are most popular impressions ; and it would not be worth combating, but for the fact that one never quite knows what may be the consequences hereafter of wrong ideas concerning the history of any important movement.

The pamphlet on "Fundamentals of a Cost System for Manufacturers," which is reproduced in the appendix, was issued on 1st July 1916 by the Federal Trade Commission, Washington (a body somewhat analogous to one of the departments of our own Board of Trade, e.g. the Census of Production Department), consisting of Mr. Edward N. Hurley (chairman), Mr. William J. Harris (vice-chairman), and Messrs. Joseph E. Davies, Will H. Parry, and George Rublee. But although an official document, published by the Washington Government Printing Office, it is given a distinctly personal touch by the preface, signed by the chairman, which is in the following term :—

To the American Manufacturer,

The Federal Trade Commission has found that an amazing number of manufacturers, particularly the smaller ones, have no adequate system for determining their costs, and price their goods arbitrarily. It is evident that there must be improvement in this direction before competition can be placed upon a sound economic basis.

With the object of aiding in the improvement of business generally, we have endeavoured in this pamphlet to show briefly the importance of accurate manufacturing costs, and the fundamental principles underlying them. I commend it to your attention, and feel satisfied that if you will read carefully, you will find many helpful suggestions.

The pamphlet has been prepared under my direction by Mr. Robert E. Belt, chief accountant, and Mr. R. W. Gardiner, assistant.

Trusting we may have your hearty co-operation,

I am, very respectfully yours,
(Signed) EDWARD N. HURLEY.
Chairman.

It is difficult to imagine our own Board of Trade, or any department thereof, issuing a blue-book intended for the information of British business houses accompanied by a similar dedication, but there can be very little doubt that our Government publications would be very much more widely read if someone took ever such a little trouble to try and make them more readable.

Before proceeding to discuss in detail this very interesting pamphlet on "The Fundamentals of a Cost System for Manufacturers"—which, be it noted, does not attempt to go further than to lay down the main principles upon which any satisfactory system of manufacturing cost accounts must be based, it is, I think, just as well to mention that the skeleton system there described is by no means novel and does not claim to be novel. It bears, indeed, a rather remarkably strong resemblance to a system described in Part III of my "Bookkeeping for Accountant Students," which was first published in 1893. It is, of course, exceedingly probable that no member of the Federal Trade Commission has ever read this book, in just the same way that, at the time I wrote it, I had not myself read any other book upon Cost Accounts. I draw attention to the matter simply because it shows that we each, when trying to evolve independently the basis upon which a system of reliable Cost Accounts for manufacturers must be founded, came—as it seems to me, necessarily and irresistibly—to very much the same conclusions.

No system of accounting can be satisfactory that is not based upon double-entry. No complex system of accounting is possible without the aid of sectional balancing. Accordingly, Cost Accounts—which must necessarily be voluminous to be of any use whatsoever—must be treated as an independent department, and linked up with the general system of financial accounts upon the lines of sectional balancing.*

If they are not so linked up, it is practically certain that the results shown by the two sets of records will not agree; and, as time goes on, they will naturally tend to drift further and further apart, in just the same way—and for precisely the same reasons—that books which are never balanced tend to become more and more inexact. It seems unnecessary to emphasise the fact that inaccurate accounts are altogether useless.

That it should have been necessary for the Federal Trade Commission to issue such a pamphlet as that now under discussion shows, I think, sufficiently clearly that only a minority of manufacturers in the United States are keeping proper Cost Accounts, or even understand what such accounts should consist of. But it must be conceded that there is at least as much scope for an educational campaign in this country, although far less hope that it will ever be undertaken by a Government Department here. Even if it were so undertaken, it would probably be of little practical use, for the simple reason that it is inconceivable that our Board of Trade (as at present constituted) would ever issue a pamphlet at all upon the lines of that published by the Federal Trade Commission, and even more unlikely that any considerable number of British manufacturers would read it if it were issued.

*The question has often been discussed—sometimes with much unnecessary heat—as to whether "accountants" are the proper people to keep cost records, or whether they ought not to be kept by a special class of "cost accountants" who are skilled in manufacturing processes. To the impartial observer, the matter does not appear to be of vital importance; it is, however, essential that all kinds of accounting records should be made by competent and experienced persons, sufficiently acquainted with the real nature of the transactions they are endeavouring to record, and it is of real importance that records which *inter alia* provide the material upon which works management may be criticised with intelligence should not be too much under the sole control of the Works Manager—*i.e.* the accounting party. A separate Cost Department, linked up with the Accounts Department upon lines of sectional balancing, seems to be the best—if not the only—way of uniting all these conflicting requirements.

During the past twenty years or so I have had many opportunities of discovering what is being done in this country in the direction of Cost Accounts, and the view that I have formed is that while good costing has long been usual among the basic industries, such as coal and iron, so far as general manufacturers and contractors are concerned, it is only quite recently that anything really serious has been attempted upon anything like an extensive scale. Even now, there are quite a large number of business men who think they are working upon up-to-date lines who have literally no conception of what Cost Accounts are. In many cases what are called "Cost Accounts" are calculations, made at arbitrary intervals—when specially called for—estimating, or guessing the cost of some particular article or service, wholly without reference to the cost of other articles produced or services rendered : calculations which have absolutely no connection whatever with the accounting records proper, and are at best but fragments of what a proper costing system should be, with all the attendant dangers of inaccuracy. In other cases, where something called by the name of "Cost Accounts" is continuously compiled, I have found, upon inquiry, that it is a record as to cost of labour only, or (still more rarely) a record of the cost of labour and materials, i.e. prime costs, the whole question of overhead charges, or oncost, being disregarded, as being "too complicated" for treatment in actual practice.*

I do not think it would be overstating the case to say that, in the majority of instances, manufacturers in this country, even when they think they are keeping Cost Accounts, do not keep them upon any recognised system of accounting, and do not keep them in such a form as to be capable of being reconciled with the financial books.

There is no harm whatever in the Cost Accounts being organised as a separate department. Indeed, there is, I think, a good deal to be said in favour of such an arrangement ; but however the department may be organised it is essential, seeing that it deals with records of events, that it should be based upon

* There does not even seem to be any very general agreement as to what "Prime Cost" consists of; while the fact that Labour and Materials can often only be bought at fixed prices, and that "Overhead" is the one great variable that wants the most careful watching, is often overlooked altogether.

proper accountancy principles, and that those responsible for the accuracy of the record, while keeping in touch with operative methods, should also keep in touch with the Accounts Department proper. This is an end that can readily be achieved, if the Costs Department be organised as a sort of off-shoot of the Accounts Department, worked upon the principles of sectional balancing. It cannot be worked satisfactorily upon any other principle whatsoever. Too often, however, where it exists at all, the Costs Department is worked upon no recognisable principle of accounts, but represents merely something which those responsible for works management have felt compelled to build up, because the Accounts Department never by any chance gives them the kind of information that they want, or, indeed, any useful information in time to be of practical value

The truth would seem to be that, in too many cases, the Accounts Department of a manufacturing business is entirely out of touch with practical requirements. Not infrequently it seems to glory in its isolation. In the majority of cases those connected with it seem to take a pride in dissociating themselves from the practical side of the business, and express a lofty contempt for it and its methods. Their ideal, and their sole ideal, is too often to build up annual accounts for submission to shareholders in general meeting ; and but too often these accounts altogether fail to show the real results of the actual working of the undertaking year by year, because a deliberate policy has been embarked upon of "averaging" results, with a view to showing as nearly as possible uniform profits from year to year. I say nothing now upon the subject of Secret Reserves generally, or their permissibility ; but I do wish to emphasise the fact that the effect of constituting such reserves is to prevent the annual accounts from showing actual working results, and therefore necessarily to prevent their keeping in close touch with any proper system of Cost Accounts, which must necessarily aim at showing "the truth, the whole truth, and nothing but the truth," whether such truth be palatable or not.

It cannot truthfully be said that the Institute of Chartered Accountants in England and Wales has hitherto done much to encourage a study of manufacturing costs. I have examined the sixteen published

volumes of *The Accountants' Manual*, which deal with the half-yearly examinations of the Institute from December 1884 to June 1916 inclusive—a period of 32 years—and I find that, during that time, only 41 questions were set which might possibly be regarded as having some bearing upon Cost Accounts, and that no questions whatever appeared upon the subject in Volume XVI of *The Accountants' Manual* dealing with the last two years of the above-named period. In the course of these 32 years, 64 half-yearly Intermediate Examinations and 64 half-yearly Final Examinations were held, making a total of 128 examinations. At each of these examinations two papers, of ten questions each, have been set on "Bookkeeping and Accounts" making a total of 2,560 questions in all, of which only 41 (or less than 1½ per cent.) had any sort of connection with Cost Accounts. A further scrutiny of these 41 questions shows, however, that no less than 19 of them are not really connected with manufacturing costs at all, but rather with the cost sheet of some concern continuously producing a single product, and for all practical purposes these 19 questions represent the same question re-set on nineteen different occasions. It was set 13 times during the 20 years ended June 1904, six times during the ten years ended June 1914, and not at all during the ensuing two years. The remaining 22 questions on Cost Accounts for the most part are so general, or so elementary, as to suggest that the examiners responsible for them attached no real importance to the subject.

Like all other accounts, Cost Accounts are required for the purpose of arriving at records of actual facts; to enable those responsible for management to apportion praise and blame, and to enable them to build up in the future a business policy founded upon experience, rather than upon surmise or guesswork. They are particularly valuable when margins of profit are low, and when, therefore, the most rigid economy must perforce be practised; when there is the most urgent need to compare the relative costs of alternative methods; and also, from time to time, when the question arises as to whether it is, or is not, worth while to increase the output.

Cost Accounts must give prompt results. If anything requires to be altered, clearly it is important

that it should be altered at the earliest possible moment, rather than that the disadvantageous conditions which have been discovered by the Cost Accounts should be continued unnecessarily.

In those cases where selling price is based upon cost price, manifestly the selling price cannot be fixed until the cost price is known. In such cases any delay in arriving at the cost price involves a corresponding delay in fixing the selling price, and, in consequence, a loss of interest through delay in payment, as well as an appreciably increased risk of bad and doubtful debts, to say nothing of the annoyance and inconvenience caused to the customer, who in the meanwhile is kept waiting for a figure of "cost" that he, in his turn, requires.

The pamphlet now under discussion attempts most pluckily to lay the foundations of a uniform system of costing, applicable to all classes of manufacturing business. It is perhaps an open question as to how far absolute uniformity is practicable. It is also a matter for discussion as to how far uniformity is desirable, seeing that uniformity necessarily involves stereotyped methods, and a withdrawal of all further incentive towards progress. Upon the whole, I think that, for many reasons, uniformity of method is undesirable as it would in all probability be impracticable of accomplishment. But, as regards principles, there are certainly not the same objections to uniformity *per se*; and, inasmuch as the pamphlet now under discussion attempts little more than the enunciation of principles, it would appear here to be upon fairly safe ground.

Particularly valuable is that portion of the pamphlet which emphasises the great importance of a proper method of dealing with Overhead Charges. As has already been stated, most existing systems are very defective in this respect. Some ignore the question of Overhead Charges altogether, and are content to arrive merely at a basis of prime cost. Others, which profess to deal with the subject and to arrive at total costs, do so by adding to the prime cost a "loading" which it is estimated will in the course of a year (or other financial period) amount approximately to the Overhead Charges actually incurred during that time. That is to say, in fact, they drop all attempt at accurate costing, and from this stage onward substitute estimates for facts.

However necessary it may be to make allowances mentally for the fact that working costs will necessarily be abnormal during abnormal periods, there can, it seems to me, be no justification whatever for running away from the actual facts of the case. Broadly speaking, the facts are that, during periods of great activity, such work as can be turned out at all is naturally turned out subject to a smaller "loading" in respect of Overhead Charges than would be inevitable in the case of work turned out at times when the factory is run on short time.

Further, Cost Accounts, to be useful, should not be trimmed up and averaged down upon a yearly basis. There is, so far as practical working is concerned, nothing whatever that is magical about the yearly period, however much this period may appeal to shareholders, and those who think like shareholders. The Overhead Charges in any business are fluctuating day by day, as the activity of the work fluctuates. The aim should undoubtedly be to apportion the Overhead Charges actually incurred over the work done during the time when they were incurred. If we admit this as a sound principle, it is quite unnecessary for us to carry it to an extravagant length. It may fairly be regarded as unnecessary, and unpractical, to attempt to apportion the Overhead Charges of each separate hour over the output of each separate hour; but, inasmuch as for most purposes working costs are determined upon a monthly basis,* the month would seem to be the normal basis upon which to deal with Overhead Charges.

It is always practicable to determine very closely indeed the actual Overhead Charges in respect of each "month," and these will certainly not be uniform, although they will naturally fluctuate less than do the items constituting prime cost. If the actual Overhead Charges for the month be equitably apportioned over the output for the month, that is for all practical purposes dealing with them on a basis of actual fact. In some cases this is actually done in practice, thus demonstrating that there is no inherent difficulty about the adoption of the principle; but I think it would be safe to say that

*Usually, a quarter consists of two months of four weeks each, and one "month" of five weeks, making thirteen weeks in all. Twice in each eleven years, the working year consists of 53 weeks, in which case, one quarter contains 14 weeks.

Overhead Charges are not thus treated, and the facts thus truly faced in ten per cent. of those factories which claim to be keeping proper Cost Accounts. In the majority of cases, estimates seem to be preferred to facts so far as Overhead Charges are concerned; and that, apparently, for the reason that works managers and others, whose work the Cost Accounts are intended to scrutinise, seem deliberately to prefer Cost Accounts that gloss over awkward facts, and show "pretty" results. We must not be too hard upon them for this, for where, after all, can one expect to find the accounting party who, if left to himself, would devise the most perfect means of enabling us to call him to account? The works manager who asks for Cost Accounts naturally wants them for his own purposes. He does not institute them to enable managing directors, and such like, to give him something extra to worry about.

A particularly valuable part of the pamphlet now under discussion is that which emphasises the need for departmentalising Overhead Charges, to enable them to be apportioned over the output upon a reasonable basis. This departmentalisation should be upon two principles, operating so as to speak transversely:—

(a) As regards each item of output, Overhead Charges will require to be sub-divided into groups, so that all such charges are not apportioned over the output upon the same basis.

(b) Certain groups of charges connected with specified departments should naturally be apportioned over the output of those particular departments alone.

The works manager has perhaps a natural reluctance to go quite so far as this. Even although he admits the inherent reasonableness of the view put forward, he is apt (perhaps a little naturally) to hesitate, lest he should be embarking upon something which—however sound in principle; however perfect in theory—is impossible of actual attainment. Here, as elsewhere, some idea of proportion is helpful. In cases where Overhead Charges do not exceed (say) 15 per cent. of the prime cost, it is perhaps not very material what method in reason be adopted for apportioning the former over the various units of output; but when, as is not infrequently the case,

Overhead Charges may be anything up to 50 per cent. of the prime cost (or even more), it is manifest that greater precision is essential before any useful results can be obtained. When, further, it is borne in mind that, even if the most complex system of dealing with Overhead Charges conceivable were to be adopted, the number of accounting entries in connection therewith need never exceed (say) 5 per cent of the accounting entries required in connection with prime cost, it will, it is hoped, be realised that there is really no reason whatever to hesitate, on the grounds of its complexity, about the adoption of any method of handling Overhead Charges than may command itself upon its merits.

The truth of the matter is—and the fact cannot be insisted upon too strongly—that no system of Cost Accounts sufficiently detailed to be of any practical value to the general manufacturer can possibly be produced quickly enough for the results to be of any real use whatsoever without the aid of office machinery. There is no reason for supposing that the last word has yet been said upon the subject of office machinery: but, even as matters stand, there is ample equipment for those who choose to utilise it to enable them to prepare Cost Accounts, as near perfection as possible, far more promptly than anything that they have hitherto imagined conceivable, at approximately one-tenth of the cost of Cost Accounts prepared upon the old-fashioned methods. To attempt to go on keeping Cost Accounts by hand at the present time seems as childish as it would be to attempt to keep down the water in a coal-mine to-day by the methods which were regarded as wonderful when invented by Watt in 1769. Yet, be it remembered, there are quite a large number of intelligent men, probably the majority, who are still keeping their accounts upon methods which are almost the exact counterpart of those in use in 1494! There have been amazing advances in factory methods during the past fifty or sixty years, but there has been strikingly little alteration in the accountancy methods adopted in most factories.

In connection with a practical system of Cost Accounts, we may make our selection among the following devices:—

(1) *Typewriters* to enable us, by means of carbon sheets, to manifold copies of requisitions, &c., which take the place of handwritten first-entry records.

(2) *Cards or Loose-Leaves*, each limited to the record of a single process, or event, and thus readily lending themselves to assemblage into totals under any desired number of classifying headings indicated by numbers (i.e. job numbers, stock account numbers, workmen's numbers, &c.).

(3) *Clock Machines*, designed to record instantaneously and accurately times of starting and finishing operations.

(4) *Slide Rules*, or other mechanical devices, designed to enable us to calculate with certainty and speed the time occupied in performing specified operations.

(5) *Comptometers*, and other similar calculating machines, designed to enable us to arrive rapidly and accurately at the money value of work done, or stores issued as the cases may be, in respect of specified operations.

(6) *Filing Trays or Cabinets*, in which may be stored, under appropriate headings, isolated records of individual operations until the results in connection therewith can conveniently be summarised hereafter.

(7) *The Addressograph*, to reproduce any kind of stereotyped record upon clock cards, pay rolls, pay envelopes, &c.

(8) *The Burroughs Adding Machine*, for listing operations, particularly in connection with the construction of pay sheets, and the reconciliation of the total thereof with the value of work done, as charged up against individual Cost Accounts.

(9) *The Hollerith Machines*, which are particularly valuable as a means of mechanically sorting punched cards representing individual operations upon any desired basis any desired number of times from any desired number of different standpoints, and afterwards assembling the results in tabulated form.

It will very possibly be said that, in giving the above list, I have not approached a complete recital of all the ingenious mechanical devices now at the service of the intelligent cost accountant. This is undoubtedly true. My object has not been to aim at completeness, but rather to mention machines which I know to be suited to the particular work that I

have allotted to them respectively. I have no hesitation in stating that, with an office properly equipped with these machines, a capable cost accountant provided with a junior staff costing (say) £5 a week, would be able to get through more work more accurately—and infinitely more promptly—than would be possible under old-fashioned methods with a staff costing ten times that sum.

But, when all has been said, it must, of course, be borne in mind that Cost Accounts are only a means to an end, and not an end in themselves. Cost Accounts are not a cure for managerial inefficiency. All that they can reasonably be expected to do is to show where there is evidence of inefficiency, and where there are leakages. It remains for the capable heads, having their attention directed to the weak spots, to take steps to secure their removal. I do not imagine that anyone will ever invent an office machine that will enable a business to do without a really competent general manager.

APPENDIX.

A Report issued by the Federal Trade Commission of Washington, U.S.A., reproduced by kind permission of the Chairman.

It is a fact too little realised that an accurate determination of costs is fundamentally related to manufacturing efficiency. More and more concerns are joining the ranks of those who realise the necessity of knowing accurately their costs of manufacturing and selling. Every business man who joins in this work can feel that he is doing his part toward the improvement of business conditions generally, and his own business conditions in particular. This bulletin, published by the Federal Trade Commission of Washington, U.S.A., has been prepared with a view to aiding the campaign of education by explaining what a cost system is, how it operates, the results obtained, and the benefits to be derived from its operation.

Objections to Installing Cost Systems.

There are a number of objections in the minds of business men who have not installed costs systems to taking the matter up. One of these is the feeling that exists in the minds of so many that their business is unique and different from any other, and that no system could be devised which would give them true costs. It is unquestionably true that some lines of manufacture lend themselves more readily to the installation of a cost system than others, but it is also true that no line of manufacture is so complicated that a system cannot be devised which will give reasonably accurate results.

The most common objection is that of the cost of installation and the expense of operation. Many manufacturers are of the opinion that a cost system means an interminable amount of detail and red tape, and the assistance of a number of extra clerks. It is true, in many cases, that some extra labour may be required, but not to the extent that the manufacturer fears. There is in nearly every office that is not systematised sufficient unnecessary work done to cut the extra work down to a minimum, and, in fact, in some cases where an office has been systematised, it has not been necessary to employ any extra help at all. If the manufacturer will look upon a cost system as an investment which he expects to produce for him a fair return in the same manner that an investment in improved machinery would, the objection as to the expense is not a valid one. A number of business men think that money spent for stationery is wasted, and that a cheap ready-made book will answer as well as

one specially designed for his business. If a 10 dollar book which lasts a year will save half an hour a day for a 12 dollar-a-week clerk as compared with the use of a ready-made book which can be bought for 1 dollar, the additional investment of 9 dollars has brought in a revenue or effected a saving of 39 dollars for the year. This holds true of nearly all specially designed forms as well.

Other business men are of the opinion that they do not need a cost system because they know what their goods cost. They may, and a number of them do have an approximate idea of what their goods cost, but in a large number of instances this supposed knowledge is based on foremen's guesses in advance as to the time necessary to do the work or as to the time spent on the work after it is done. Guesswork is unsafe and poor business practice.

Necessity for Ascertaining True Costs.

Formerly the necessity for the determination of true manufacturing costs was not as imperative as it is to-day. Margins between cost and selling price in most lines were larger. Costs could be ignored except in a general way and a good return still be made on the investment; but to-day margins of profit in most lines of trade are very much narrower than formerly, and the necessity for the most efficient management and closest analysis is felt as never before.

It is necessary to-day for the business man's success that he know on what articles he is making a profit and on what he is incurring a loss. Competitive conditions are seriously disturbed where losses on one or more articles are recovered by profits on other articles. It is obvious that a manufacturer should not only know the cost of each article he manufactures but that he should see that every article manufactured bears its proper share of factory and general overhead.

Most manufacturing plants have grown to a size which renders personal supervision impossible. The only reliable way, therefore, by which an executive can judge of the efficiency of an organisation is through a system of periodical statistical reports. These reports can only be accurately obtained when a good cost system is in operation.

New methods are being introduced and improved machinery installed in the factory every day, with a view of reducing costs either by the elimination of waste or by increasing efficiency. It is impossible to know whether the introduction of these improvements will reduce costs unless the manufacturer knows not only what his total cost is but exactly what items make up the total. Items of cost are frequently lost track of when the total only is considered, while if these items were properly segregated so as to show what they were they could be materially reduced and, in some instances, eliminated altogether.

Exchange of Statistical Information Beneficial.

In the past many manufacturers disliked to give out information concerning their business. To-day the reverse is the case. Trade associations are compiling statistics as to production, shipments, and costs for the benefit of their members, and the manufacturer, instead of trying to keep this information to himself, welcomes the opportunity to supply the data, knowing that his competitors are doing the same thing and that these statistics will be of benefit to himself and to his industry. The Federal Trade Commission is keenly alive to the value of this information.

The Commission is urging manufacturers to determine their costs accurately in the interest of better trade conditions. It believes that anything that is of benefit to an industry is of benefit to the public, and it is also of the opinion that the nearer cost systems approach uniformity the more valuable will be the results.

Many Businesses not Profitable.

A large proportion of manufacturers are not making the money they should. A great number of them are actually losing money.

The purpose of conducting a business is to make money, and the only way to make money is to sell something for more than it costs. The first essential, then, is to know the cost. It is the belief of the Commission that the small margin of profit existing in so many of our industries is due to the ignorance on the part of manufacturers of what their goods actually cost to produce. This ignorance causes them to make unprofitable prices, which the manufacturer who does know his cost is forced to meet to a large extent.

What is Cost?

Cost is defined as the amount or equivalent paid, or charged, or given for anything; loss of any kind, expenditure, outlay, as of money, time, labour.

This equivalent may be in the form of money paid for material or for labour, or for some one of the many kinds of expense or loss that exist in every manufacturing business. It is apparent that cost consists of three elements, viz. material, labour, and expense.

System and its Development.

The problem is to ascertain the amount of each of these elements, and in order to accomplish this in the simplest and most practical manner the manufacturer has recourse to system. System is defined as a regular method or order, a formal arrangement, or a mode of operation governed by general laws or rules.

During the last ten years the best accounting brains in the country have been devoting a great deal of time to the perfection of general laws or rules which will give the desired results with the least effort and expense, and the outcome of their work is what is known as a "Cost System." This provides not only for the determination of the amount of each element of cost properly chargeable to each job or operation, but also provides for an improved method of bookkeeping which causes the books to reflect at all times the true financial and industrial condition of the business and renders possible the preparation of monthly statements of conditions, as well as complete monthly statements of financial and factory operations.

There are, generally speaking, but two distinct methods of manufacture. Each requires a cost system a little different in detail but identical in fundamental principles. The first of these is used in a business where every order is a separate article of manufacture, very often made to order, and the selling price fixed before work is started; and the second is used in a business where the output consists of one or more articles which are being continually produced. For convenience we will designate the cost systems applicable to each as the "Job Cost System" and the "Continuous Production System."

THE JOB COST SYSTEM.

The first step is to provide for giving the factory instructions as to what work is to be done, and a form should be provided which must give the following information: Job number, date, name and address of customer for whom work is to be done, a description of the work to be done, giving sufficient details, specifications as to what material will be needed, and shipping instructions. This form should also have space for the entry of shipments, so that when the work is done the order form will be a complete record. A duplicate of this factory order should be kept in the office, and when the original is sent to the factory the cost clerk opens a job cost sheet under that number.

The job cost sheet should show number, date opened, customer's name, and, in some cases, a brief description of the work is advisable, as it sometimes enables the cost clerk to detect an error in the number shown on the time ticket or material requisition. As all reports are made by job number instead of by name, it is of vital importance that the greatest care be taken to insure the correctness of the numbers on the time tickets and material requisitions. In addition to the above information, the cost sheet should be arranged so as to provide columns for the following: Date, employee's number, hours, amount of pay, machine number, machine hours, requisition number, quantity of material, and cost thereof.

Material.—The first element of cost is material. Material is of two kinds, direct and indirect.

Direct material is that which forms part of some particular job and can be so charged. Indirect material is that which cannot be located as belonging to a particular job, and which is more in the nature of general supplies. This class of material is sometimes termed "expense material," as its ultimate destination is the Expense Account of some department.

Material must be purchased, received, checked, and taken care of until it is required for use, and the general method recommended is as follows:—

A part of the factory should be set aside as a stock room and some employee designated to perform the duties of stock clerk. The stock clerk will keep the stock ledger cards or sheets, one for each article, showing the quantity on hand. These cards should also show the maximum quantity of each article he is to be allowed to carry and also the minimum below which the stock must not be allowed to fall. When the stock reaches the minimum a requisition should be made on the purchasing agent for sufficient quantity to bring the stock up to the maximum and sent to the superintendent or works manager for approval, after which the goods are ordered. When the goods come in they should go to the receiving clerk, who checks them, reports their receipt to the office, and delivers the goods to the stock room, where they remain until requisitioned out.

When the order reaches the factory the first step is to obtain the material, and a requisition should be made on the storeroom for the necessary quantity. This requisition should be numbered and space should be provided thereon for job number or department, date, quantity, description, price, amount, and signature of foreman. The cost clerk extends the amount on the requisition and posts it to the job cost sheet in the space provided, then files it away until the end of the month, when the total for the month must be obtained.

Labour.—The second element of cost is labour, and this, like material, is divided into two classes—direct, or, as it is sometimes called, productive labour, and indirect, or non-productive labour. Direct labour is that which is applied directly to the job and which can be so charged. Indirect labour is that which cannot be located as belonging to any particular job, but must be charged to the expenses of some department.

The general method of handling labour is to have each employee make up a time ticket each day. This ticket, for recording direct labour, should show the employee's name, employee's number, date and hours worked on each job, job number, and machine number, if a machine

is used; and in the case of indirect labour the department and nature of the work must be shown in lieu of job number. These time tickets are sent in to the office each day and the direct labour is posted to the job cost sheets and the indirect labour entered on a summary sheet with columns headed by the name of departments, so that the totals can be posted to the Department Expense Account at the end of the month.

The productive hours for each department are entered on another summary, both for man hours and machine hours, which is totalled at the end of the month. If the work is correctly done, the totals on this summary will equal the total of the postings made to the job cost sheets.

Overhead Expense.—The job cost sheet now has entered thereon the first two elements of cost., viz. direct material and direct labour, and the next question is the proper method of handling the third element of cost, which is generally known as "Overhead Expense," or, as it is also called, "Burden." Overhead expense is the expense of every kind connected with the business, none of which can be directly located as belonging to a particular job. These expenses, while part of the cost of a job, are general, so cannot reach the job direct; hence a method must be devised for them to reach the cost sheet in an indirect manner, the method at the same time being so planned that each job will receive its fair proportion of the total.

Before taking up the question of how overhead expense is to be handled, it is necessary to determine just what items constitute overhead. A list of these items and their description must necessarily be very general and subject to change, as items of expense occur in some lines of manufacture which it is necessary to treat as overhead while the same items in another line can be handled as direct expense.

Overhead may properly be divided into two classes—factory overhead, which consists of items directly belonging to factory operations, and general overhead, which is expense not directly connected with the factory.

As factory overhead is one of the items of total factory cost, the method of handling this will be outlined first.

Departmentalisation Necessary for Proper Distribution of Factory Overhead.

The first step in a fair and equitable distribution of factory overhead is a departmentalisation of the business. Every business can be departmentalised to some extent, some more than others, but the subdivision into departments varies so much in the different lines that it is almost impossible to give any definite idea as to what division should be made. Generally speaking, it is best to subdivide into departments according to operations of manufacture, although at times, for simplicity, a subdivision

which places similar work in the same department regardless of operation is used and has proved satisfactory in a number of cases. By similar work is meant hand workers who use practically the same amount of supplies, machines of similar type, &c. Departmentalising by operations is a little more complicated, as it results in a greater number of departments, because the same or a similar kind of hand work may be done in several departments, and the same holds true of the machine departments.

In a number of lines of manufacture all work can be placed in one department where the unit of production is the same, i.e. with hand workers the unit is the productive man hour, with machine workers the machine hour, and in other departments the unit may be pound, ton, piece, dozen, square feet, yard, &c. In departmentalising a business the fact should be borne in mind that the better the departmental subdivision is made the more accurate will be the cost results.

Fixed Factory Charges.

Building expense, power, insurance, taxes, and depreciation constitute what are generally known as "Fixed Factory Charges," because they are practically fixed, and the factory has nothing to do with either increasing or decreasing them.

Building Expense.

The first requisite of a business is a place in which to work; consequently the first item of overhead is Building Expense or Rent. If the building is owned by the manufacturer, the building expenses consist of insurance, taxes, depreciation, and repairs, together with such other expenses which are general in their nature, but yet are necessary to render the building useful, such as heat, light, elevator, janitor, and water. If the building is rented the items of insurance, taxes, depreciation, and repairs are paid by the owner, and in lieu of these is rent. Rent includes a return on the investment in addition to the items named, so when it is desired to make comparisons between plants where the building is owned and where it is rented, the return on the investment must be taken into consideration.

The basis of distribution for all rent charges is the productive or used square feet. The total used square feet divided into the total rent charges gives the charge per used square foot. This result multiplied by the used area of the department gives that department's proportion of the total rent expenses. By used floor space is meant that which is actually in use, exclusive of stairways, passages, elevator space, and idle or unused space.

Power.

The second requisite is power, and this must be obtained either from outside sources or generated in one's own plant. The distribution of power is a little more difficult than that of building expense, and sometimes an arbitrary division based on the opinion of the engineer and superintendent is used, but this method is not recommended. One difficulty in distributing power charges is that very often the same boiler supplies steam for heating and steam for power generating, and it is difficult to say how much for each.

For distributing power charges the factor generally used is found by multiplying the horse-power required by each machine or department by the average hours run by each and dividing the sum into the total power charge. Power distribution is a problem in itself, and it varies so much in different plants that it is impossible to lay down any rules for its solution. Each plant must be treated in an individual manner according to the existing conditions.

Insurance and Taxes.

Insurance and taxes should be distributed on the basis of the actual net value of the equipment in each department. This refers to fire insurance and taxes on the plant only, as boiler insurance is a charge to power, accident insurance is a charge to general factory expense, and the charge for other forms of insurance is determined by the nature of the insurance. Taxes on real estate and plant only are chargeable against manufacturing operations, as taxes on finished goods in stock and franchise taxes are chargeable to general expense, while income-tax is a direct charge to profit and loss.

Depreciation—The Necessity of including in Cost.

Depreciation is one of the most important of all the overhead expenses, because it is generally the largest. There has probably been more written on this subject than any other item of overhead, but there are so many different ways of handling depreciation, some of which are best adapted for one line and some for another, that there is really no recognised standard method. It is universally admitted, however, that depreciation does exist, that it is an element of cost just as much as labour or material, and that any system which does not provide for including it is faulty and one that will not give true costs.

Methods of Determining Depreciation.

One method of handling depreciation, which is unqualifiedly condemned although extensively used, is to wait until the end of the year, and then if the profit and loss statement shows that a good profit has been earned to

charge a part of this profit to depreciation. If, on the other hand, the profit and loss statement shows little or no profit, nothing is charged to depreciation. It is difficult to understand how any practical man can take the view that his plant and equipment have not worn out because he has not made a profit and at the same time have worn out when he has made a profit.

The first step necessary to provide for proper depreciation is to departmentalise the plant values. The next step is to take each kind of equipment or machine and figure its proper depreciation.

There are several methods of determining the amount of depreciation. One is to estimate the scrap value and deduct this figure from the original cost. The difference is then divided by the estimated life of the machine in years, and the result is the annual depreciation on that machine. A modification of this method which is not quite as simple, but really affords no difficulty, is after ascertaining the amount to be charged off during the life of the machine to determine a percentage which, when applied to the net book value of the machine, will leave only the scrap value of the machine on the books at the expiration of its estimated life.

To illustrate: If the initial cost of a machine and equipment is 1,000 dollars and the estimated scrap value is 200 dollars, with an estimated life of 10 years, then 800 dollars is the amount that must be charged into cost during that period, or 80 dollars per year. To attain this result, by using the net value of the machine as a basis, a rate of 15 per cent. would be necessary, which would make the depreciation 15 per cent. on 1,000 dollars, or 150 dollars, the first year; 15 per cent. on 850 dollars, or 127.50 dollars, the second year, &c. The advantage of this method in the interest of normal costs is that the decrease in depreciation charges is ordinarily offset by an increase in repairs.

Variable Factory Charges.

Variable charges or controllable expenses are the final items of factory overhead. These are subdivided departmentally and charged to the Expense Account of each department. Owing to the fact that no two lines of manufacture have the same kinds of expenses, a description of them must be very general. Such items as non-productive labour, repairs, lubricating oils, and miscellaneous supplies are found in nearly all Expense Accounts.

Factory expenses are incurred which cannot be located as belonging to any department, and these items should be charged to an account called "General Factory Expense." This account should be distributed over the Departmental Expense Accounts on some basis which is fair to all, the nature of this distribution varying as to

special conditions existing in each particular business. Great care should be taken to prevent anything being charged to the General Account that could possibly be charged to one of the Departmental Accounts, as otherwise, either through carelessness or lack of knowledge, the General Account will become the dumping ground for all items the charge for which is in the least doubt.

Interest.

The question of whether interest on the capital invested is a proper charge against cost of production is one on which there is a marked difference of opinion. The cases where it is considered desirable to include interest in cost may be grouped under two heads:—

1. Where materials have to be stored for long periods while a seasoning process is being completed.
2. Where it is desired to show the effect of variations in the amount of capital employed and the term of employment.

As seasoned material has a higher value than when first purchased, it is apparent that the interest on the capital locked up during the seasoning forms in a sense a direct part of the cost of the material. If the material were purchased in a seasoned condition, a higher price would have to be paid, and this price would at least include interest and other carrying charges.

As some manufacturing processes require the use of expensive equipment, or take a long time to complete, both of which tie up capital, while other processes require neither the equipment nor the time, it is impossible to get true relative costs unless consideration is given to interest on the capital employed.

Cost accountants and industrial engineers, for comparative and statistical purposes, almost unanimously advocate including interest in cost, and so far as interest is included in cost for comparative or statistical purposes it serves a useful purpose.

Auditors, on the other hand, who are more directly interested in the preparation of statements showing the financial condition of a business, take the ground that interest is not an item of cost, and that to include it in cost results in an inflation of inventory values and an anticipation of profits. It is true that including interest in cost does inflate the inventory, and is an anticipation of profit by exactly the amount of interest charged to the cost of the goods on hand. In arriving at inventory values, however, the approximate interest which has been charged to the cost of the goods on hand can be readily eliminated.

It is recommended that where interest on the investment is treated as an item of cost that the interest charged to the goods on hand be eliminated from inventory values, and that in preparing profit and loss statements the amount of the interest charged to costs during the period be returned to income under the specific caption "Interest on Investment."

Ascertainment of Normal Cost.

In every manufacturing business it is unquestionably true that in some months items of expense will occur which are not properly chargeable against the cost for that month. For instance, it may be found necessary to make extensive repairs on a machine, which repairs are sufficient for the entire year, and it would be manifestly unfair to include the entire repairs in the costs of any given month. Furthermore, every business has its dull season when its departments are not running more than half time, and this would also result in the actual cost for those months being abnormally high.

These facts lead to the conclusion that what is necessary for the manufacturer to know is not "What did it cost me to produce my goods last month?" but "What would it have cost me to produce under normal conditions, and how far were my actual costs from normal?" It will be seen that if selling prices are based on actual costs during a busy season when the plant is probably working overtime, the selling prices would be so low that the plant might be literally swamped with work, while conversely, if the selling prices were based on actual costs when the plant was dull, they might be so high that no business whatever could be obtained. It is necessary, therefore, that costs be averaged over a period of time sufficiently long to take in both dull and busy seasons. The method of doing this is to establish a "Reserve for Overhead," and credit this account with the reduction in cost during the busy season and charge it with the increase in cost during the dull season. The balance of this account is closed out to Trading Account, as will be explained later.

Distribution of Overhead to Job Cost.

Having now provided for the recording of the overhead expense, it becomes necessary to provide for charging it to the different jobs. There are several methods of doing this. The first is by charging a percentage on direct labour, but this in many lines results in inaccuracies, and the method has been discarded by a large number of manufacturers, although there are many who still use it owing to its ease of operation. An illustration will show the reason for the inaccuracy of this method. One man receiving 40 cents an hour may be doing handwork, requiring no power, very little floor space, and few supplies.

If the overhead rate was 40 per cent., his hour cost would be 40 plus 16, or 56 cents. Another man, receiving the same rate of pay, may be working at a large and expensive machine, being subject to repairs, using power, several times the floor space, and using a quantity of supplies, and his cost would be figured at 56 cents also, although it is probably a fact that the machine he is using cannot be operated for less than 1 dollar an hour. Another fault with this method is that it throws most of the burden on the high-priced man, when, as a matter of fact, and this will be admitted by nearly every practical executive, the high-priced man requires less supervision and wastes less material than the cheaper one, and really should carry a less burden instead of a greater.

There are, however, some lines of manufacture where the direct labour method of distributing overhead can be used to advantage, particularly where the workmen are on a piece-work basis or where they receive practically the same wage. In such cases a percentage of direct labour will give good results.

The Productive-Hour Method.

Another method, and the one that is recognised by a majority of manufacturers and accountants as the standard, is what is known as the "Productive-Hour Method." In a plant where practically all the labour is hand labour the man hour is the basis and the total hours divided into the total overhead expense gives a rate per hour, which rate, multiplied by the hours spent on a job, gives the overhead expense chargeable to that job.

In a plant where machines are the producing unit the distribution must be on the basis of the machine hour, and the same method is pursued as in the case of the man hour.

An estimate of overhead expenses should be made at the beginning of the year based on previous years' experience with such changes as the executive's knowledge of business conditions leads him to make. This figure, divided by the expected output in hours of the machines, gives a normal overhead expense rate to be applied to all work in that department. This rate remains constant until the end of the fiscal year. The following schedule shows the method to be used in establishing this rate:—

Estimated Factory Overhead, 1916.

	Total	Dept. A	Dept. B	Dept. C
Indirect Labour ..	\$7,300.00	\$2,500.00	\$3,000.00	\$1,800.00
Building Expense ..	3,900.00	1,200.00	1,500.00	1,200.00
Power ..	8,560.00	2,800.00	3,060.00	1,800.00
Insurance ..	420.00	144.00	192.00	84.00
Taxes ..	525.00	180.00	240.00	105.00
Depreciation ..	2,625.00	900.00	1,200.00	525.00
Repairs ..	5,400.00	1,500.00	2,700.00	1,200.00
General Factory Ex- pense ..	1,950.00	1,650.00	2,100.00	1,200.00
Miscellaneous Sup- plies ..	790.00	240.00	360.00	190.00
Miscellaneous Expense ..	1,818.00	720.00	900.00	198.00
	36,288.00	11,834.00	16,152.00	8,302.00
Yearly Hours Per Unit : 365 Days 8 Hours Each ..		2,448	2,448	2,448
Less 10 per cent. ..		245	245	245
Net Yearly Hours Per Unit ..	2,203		2,203	2,203
Number of Units in Depart- ment ..	8		14	25
Yearly Hours per Department ..	17,624		30,842	55,075
Hourly Overhead Rate ..	67c.		52c.	15c.

Total Factory Cost.

The job cost sheet has now been charged with the three elements of cost, viz. material, labour, and factory overhead expense, and the total of these constitutes factory cost, to which must be added the general overhead.

Shipping, Selling, and General Expenses.

All of the items of factory cost now having been described and the goods completed and placed in the storeroom as finished goods, the next step is the method of handling the shipping, selling, and general expenses of the business.

Shipping Account is charged each month with its proportion of the fixed charges and with labour supplies and miscellaneous expense items. The total of this account is closed out to Profit and Loss.

Selling Expense is the next item to be considered. Some include everything under this head that is not charged to the factory. A better plan, though, is to separate the actual selling expense from the general expenses and include in selling only such items as salaries and expenses of the sales force whether on the road or in the office, advertising, catalogues, price lists, the cost of handling cancelled orders, &c.

Under General Expenses are included officers' salaries, office expenses (not including factory clerks), discount on sales, bad debts, bad work, franchise taxes, and other

items of a general nature. The item Bad Work included in General Expense is defective work. As every manufacturer has to contend with this item of expense it must be included with the other general expenses.

An estimate of shipping, selling, and general expenses should be made at the beginning of the year. This amount divided by the estimated cost of the total completed work for the year gives a percentage for these items. Applying this rate to the factory cost of a job, the amount which must be added to factory cost to ascertain total cost is readily determined.

The following schedule shows the method of arriving at this rate :—

*Estimated Shipping, Selling, and General Expenses.
FOR YEAR 1916.*

	Total	Distribution		
		Shipping	Selling	General
Building Expense ..	\$1,200.00	\$600.00		\$600.00
Labour ..	1,500.00	1,500.00		
Salaries ..	13,200.00			
Officers' Salaries ..	4,800.00			
Commissions ..	2,500.00			
Advertising ..	1,500.00			
Insurance ..	192.00	12.00		180.00
Taxes ..	215.00	15.00		200.00
Depreciation ..	200.00	100.00		100.00
Repairs ..	120.00	50.00		70.00
Delivery Expense ..	2,300.00			2,300.00
Discount on Sales ..	1,200.00			1,200.00
Reserve for Bad Debts ..	750.00			750.00
Miscellaneous Expense ..	325.00	75.00	100.00	150.00
	30,002.00	2,352.00	13,700.00	13,950.00
Estimated Cost of completed work, \$120,000.00				
Percentage on Cost ..	25%	2%	11.5%	11.5%

Controlling Accounts.

The principles of double-entry are carried out in connection with a cost system by means of what is known as "Controlling Accounts." The advantage of the controlling principle is that it puts the bookkeeper in position to check up the work of the cost department in totals, or, in other words, to control it. The control system will not detect an error such as posting to the wrong account, but it is an indubitable proof that the cost clerk has posted every item to the proper side of some account. It is hard to exaggerate the importance of this feature in any cost system.

Materials Account is charged with all purchases of materials from the accounts payable or voucher register. The requisitions for the month are totalled and a journal entry effected crediting materials and charging work in process. The balance of the account is the cost of the materials in the stockroom.

Labour Account is charged with the total labour, both direct and indirect. At the end of the month the account is credited with the total labour shown on the cost clerk's labour summaries and work in process charged with the direct labour and the Departmental Expense Accounts with the indirect labour. There will be a credit balance in this account which will represent the amount earned by the employees, but not paid. When the end of a pay period falls on the last day of the month, the account should balance.

The next type of controlling accounts necessary are those which reflect the overhead expenses. Building Expense Account is charged with all expenses of every kind as heretofore described, and at the end of the month a journal entry is made charging each department with its proportion of the total and crediting Building Expense Account. The entire expense of this account should be absorbed by the Departmental Expense Accounts.

Power Account is handled in exactly the same manner. The entire expense of this account should also be absorbed by the Departmental Expense Accounts.

Insurance is charged with all insurance which applies to the factory, such as fire, accident, boiler, &c. This account is credited each month with one-twelfth of the annual payment and the proper Departmental Account charged. Insurance on stock, either raw material, work in process, or finished goods, is charged to General Expense and Insurance Account credited. The balance of this account is the value of prepaid insurance.

Taxes Account is handled in the same manner as the Insurance Account, but these two accounts should be kept separate.

Depreciation Account is comparatively simple to handle. A journal entry is made each month charging Building Expense, Power, and the Departmental Expense Accounts with the amount of depreciation decided on at the beginning of the year. The credit goes to an account called "Depreciation Reserve," the effect of which is to reduce the book value of the plant and equipment, although it is not a good plan to actually reduce this value on the books. It is better to carry the Reserve Account and let the Plant Account remain at the original cost figure.

The Departmental Expense Accounts have now been charged with their proportion of the fixed charges and

with the indirect labour. The only other charges are miscellaneous expenses, supplies, and repairs, and these come from the Accounts Payable Register. These Departmental Expense Accounts are now credited with the distributed overhead expense determined by multiplying the number of operating hours by the normal hourly rate, Work in Process Account being charged. This total credit should balance the Expense Accounts, but practically there will be small balances which should be charged or credited at the end of the year to Reserve for Overhead.

Work in Process Account now stands charged with direct material, direct labour, and the departmental overhead expense. It is credited with the cost of all jobs completed during the month, the charge being to Finished Goods Account. The balance of Work in Process Account is the factory cost of incomplete work. The charge to offset this credit is to Finished Goods Account.

When goods are sold, Finished Goods Account is credited with the cost, and Trading Account charged. This figure is what is known as "Cost of Sales." When goods are returned, Trading Account is credited and Finished Goods charged with the cost of the returned goods, so that cost of sales will only be the cost of goods actually sold.

The reserve for overhead is charged or credited to Trading Account, so that the balance of the account is the true gross profit on the goods sold.

The Continuous Production System.

A system for recording the costs of a continuous product is a much simpler one than a system for recording the cost of job work, because in the former costs are figured departmentally or by processes instead of by jobs. The accounts are practically the same, except that there is not the necessity for the same detailed analysis as in the Job Cost System.

The business must be departmentalised as the first step, and the departmental divisions carefully observed, as otherwise true costs will not be obtained. The departmental divisions are different from the job cost divisions, as these should be by processes, regardless as to whether the work is of similar character or not.

Material is handled in the same way in both systems as far as purchases and delivery to stockroom goes, but in a slightly different manner after it is requisitioned out. It will be necessary to open a Material Account for each department. As the material is withdrawn for use these

accounts are charged with its cost whether it be purchased raw material or the finished product of some preceding department. The credit to these accounts will be the cost of the material used on the completed work, and the balance will be the cost of the material used on the work in process.

Labour is handled in the same manner as described in the Job Cost System except that it is not necessary to differentiate between direct and indirect labour. It is, however, advisable to keep the direct and indirect labour separate in order to get a detailed analysis of cost in each department, so that any leaks which may exist will be brought to light. All labour done in a department is part of the cost of operation of that department and must be taken up in the monthly cost sheets. There will be some general labour, such as foremen, superintendents, &c., whose work must be distributed over several departments. The basis for this distribution depends on the nature of the business. It will be necessary to open Departmental Labour Accounts which will be charged with all labour and credited with the labour cost of the completed material. The balance in these accounts will represent the value of labour done on the work in process.

There should be also an Overhead Expense Account for each department and these accounts will be charged with their proportion of the fixed charges, with all indirect material or supplies, and with all miscellaneous expense items. The credit to these accounts will be the expense incurred on the work completed, and the balance will be the expenses incurred on the work in process.

At the end of the month a journal entry is made charging a succeeding Department Material Account, or the Finished Goods Account, as the case may be, with the total cost of the product sent out and crediting each of the departmental accounts with its share of the total cost. When this is done it will be seen that the sum of the balances in these three departmental accounts—namely Material, Labour, and Expense—will be the cost of the work in process in that department. When a department has completed all the work it has and sent its product to some other department these three accounts should balance.

In some lines of manufacture, where a continuous product is made, it is the practice to issue a Works Production Order to make a certain quantity of goods, and where this practice is used the Job Cost System is used, keeping the cost by order number.

After the goods have reached the Finished Goods Account the method of treatment under the Continuous Production System is identical with the Job Cost System.

Financial and Operating Statements.

The Profit and Loss statement should be so arranged as to reflect the actual results of the period, and the figures shown thereon should not need any explanation or qualification.

For the purpose of giving the executive information as to the operations of his factory it is well to prepare a statement of factory operations. As all the figures are from the books, the preparation of this statement involves very little work and gives valuable information.

A statement of assets and liabilities should also be prepared, and the difference between assets and liabilities must be the figure shown on the Profit and Loss statement as surplus or net profit.

Where goods are purchased for resale the Profit and Loss statement should have another division showing the amount of profit on purchased goods or merchandising separate from the profit earned on manufactured goods. Where this item is small it may be disregarded and merged into manufactured goods, but the best practice is to keep them separate.

The systems outlined are believed to be simple and easy of operation. While a number of details have been explained it must be remembered that the methods outlined are general, and it is not claimed that the outlines as given would fit every business. The one thing above all others that both the manufacturer and the accountant should have in mind in installing a system is simplicity. Simplicity means ease of operation, less liability of error, and, what is equally important, economy of operation.

Ledger Accounts and Statements.

The following schedules show the Ledger Accounts necessary, the trial balance before the closing entries are made, and forms for a Profit and Loss statement, Statement of Factory Operations, and Balance Sheet. In order to enable ready reference to be made to the various entries numbers have been inserted showing the source of the entry. While the Ledger Accounts show the books as closed, it is not recommended that this be done except at the end of the fiscal year, as statements can be prepared from the Ledger without the accounts being closed.

MATERIALS.

			7.
Balance ..	\$ c.		
Purchases .. (29)	3,000.00 7,800.00	Work in Process (14)	\$ c.
Freight and Express (29)	284.32	Balance ..	6,484.32 4,600.00
	<u>11,084.32</u>		<u>11,084.32</u>
Balance ..	4,600.00		

LABOUR.

			2.
Total Pay Roll .. (29)	5,692.28	Balance ..	\$ c.
Balance	686.79	Work in Process (14)	200.00
		Building Expense (2)	4,444.67
		Power .. (4)	185.00
		Repairs .. (8)	300.00
		General Factory Ex- pense .. (9)	356.40
		Factory Overhead— Department A (10)	92.60
		" B (11)	246.50
		" C (12)	251.20
		Shipping .. (21)	185.70
			117.00
			<u>6,379.07</u>
		Balance	686.79

BUILDING EXPENSE.

			3.
Labour .. (2)	\$ c.	General Factory Ex- pense .. (9)	\$ c.
Power (Heat & Light) (4)	185.00	Factory Overhead— Department A (10)	76.29
Insurance .. (5)	84.10	" B (11)	101.72
Taxes .. (6)	12.00	" C (12)	127.15
Depreciation .. (7)	20.00	Shipping .. (21)	101.72
Repairs .. (8)	40.00	General Expenses (Office) (23)	50.86
Elevator Expenses (29)	65.00		
Water .. (29)	58.00		
Miscellaneous Materials (29)	16.50		
	28.00		
			<u>508.60</u>

POWER.

			4.
Labour .. (2)	\$ c.	Building Expense (3)	\$ c.
Insurance .. (5)	300.00	Factory Overhead— Department A (10)	84.10
Taxes .. (6)	8.00	" B (11)	252.30
Depreciation .. (7)	10.00	" C (12)	336.40
Fuel .. (29)	40.00		
Oils .. (29)	325.00		
Water .. (29)	45.00		
Repairs & Supplies (29)	38.00		
	75.00		
			<u>841.00</u>

INSURANCE.

			5.
Accounts Payable (29)	\$ c.	Building Expense (3)	\$ c.
	828.00	Power .. (4)	12.00
		Repairs .. (8)	8.00
		Factory Overhead— Department A (10)	2.00
		" B (11)	12.00
		" C (12)	16.00
		Shipping .. (21)	7.00
		General Expenses (23)	1.00
			14.00
		Balance	756.00
			<u>828.00</u>
Balance	756.00		

TAXES.

	\$ c.		\$ c.
Accounts Payable (29)	1,095.00	Building Expense (3)	20.00
		Power .. (4)	10.00
		Repairs .. (8)	2.50
Factory Overhead—			
Department A (10)	15.00		
" B (11)	20.00		
" C (12)	8.75		
Shipping .. (21)	1.25		
General Expense (23)	16.75		
Balance	<u>1,000.75</u>	Balance	<u>1,000.75</u>
			1,095.00
Balance.. . . .	<u>1,000.75</u>		

DEPRECIATION RESERVE.

	\$ c.		\$ c.
Balance	1,568.74	Balance	1,210.00
		Building Expense (3)	40.00
		Power .. (4)	40.00
		Repairs .. (8)	13.33
Factory Overhead—			
Department A (10)	75.00		
" B (11)	100.00		
" C (12)	43.75		
Shipping .. (21)	8.33		
General Expense (23)	8.33		
Balance	<u>1,568.74</u>	Balance	<u>1,568.74</u>
			1,568.74
Balance.. . . .	<u>1,568.74</u>		

REPAIRS.

	\$ c.		\$ c.
Labour (2)	356.40	Building Expense (3)	65.00
Insurance .. (5)	2.00	Factory Overhead—	
Taxes .. (6)	2.50	Department A (10)	159.00
Depreciation .. (7)	19.33	" B (11)	217.80
Supplies .. (29)	167.00	" C (12)	115.43
Miscellaneous Expense (29)	48.00	Shipping .. (21)	2.00
	<u>589.23</u>		<u>589.23</u>
Balance.. . . .	<u>589.23</u>		

GENERAL FACTORY EXPENSE.

	\$ c.		\$ c.
Labour (2)	92.60	Factory Overhead—	
Building Expense (3)	76.29	Department A (10)	155.90
Factory Office Expense (29)	265.00	" B (11)	207.79
Miscellaneous Expense (29)	141.00	" C (12)	104.30
Miscellaneous Supplies (29)	20.00		
	<u>467.99</u>		<u>467.99</u>
Balance.. . . .	<u>467.99</u>		

FACTORY OVERHEAD, DEPT. A.

	\$ c.		\$ c.
Indirect Labour (2)	246.50	Work in Process, 1,802	
Building Expense (3)	101.72	Hours, at 67 cents (14)	1,207.34
Power .. (4)	252.30		
Insurance .. (5)	12.00		
Taxes .. (6)	15.00		
Depreciation .. (7)	75.00		
Repairs .. (8)	159.00		
General Factory Expense (9)	155.90		
Miscellaneous—			
Supplies .. (29)	30.00		
Expense .. (29)	75.00		
Reserve for Overhead (13)	8.72		
			1,207.34
			1,207.34

FACTORY OVERHEAD, DEPT. B.

	\$ c.		\$ c.
Indirect Labour (2)	251.20	Work in Process, 2,523	
Building Expense (3)	127.15	Hours, at 52 cents (14)	1,311.96
Power .. (4)	336.40		
Insurance .. (5)	16.00		
Taxes .. (6)	20.00		
Depreciation .. (7)	100.00		
Repairs .. (8)	247.80		
General Factory Expense (9)	207.79		
Miscellaneous—			
Supplies .. (29)	40.00		
Expense .. (29)	85.40		
			1,431.74
			1,431.74

FACTORY OVERHEAD, DEPT. C.

	\$ c.		\$ c.
Indirect Labour (2)	185.70	Work in Process, 4,418	
Building Expense (3)	101.72	Hours, at 15 cents (14)	662.70
Power .. (4)	168.20		
Insurance .. (5)	7.00		
Taxes .. (6)	8.75		
Depreciation .. (7)	43.75		
Repairs .. (8)	115.43		
General Factory Expense (9)	104.30		
Miscellaneous—			
Supplies .. (29)	20.00		
Expense .. (29)	61.50		
			816.35
			816.35

RESERVE FOR OVERHEAD.

13.

Factory Overhead—		\$ c.	
Department B	(11)	110.78	Factory Overhead—
" C	(12)	153.65	Department A (10)
		273.43	84.32

Factory Overhead—		\$ c.	
Trading	..	(20)	189.11
		273.43	

WORK IN PROCESS.

14.

Balance ..		\$ c.	
Material ..	(1)	2,000.00	Finished Goods (15)
Labour ..	(2)	6,480.32	Balance
Factory Overhead—			12,086.13
Department A (10)		1,207.34	
B (11)		1,311.96	
" C (12)		662.70	
		16,110.99	16,110.99
Balance		4,024.86	

FINISHED GOODS.

15.

Balance ..		\$ c.	
Work in Process ..	(14)	3,751.00	Trading (cost of sales) (20)
Cost of Returns	(20)	12,086.13	Balance
		597.12	8,801.53
		16,437.25	7,635.72
Balance		7,635.72	16,437.25

SALES.

16.

Sales Returns ..		\$ c.	
Sales Returns ..	(17)	865.20	Accounts Receivable (28)
Sales Allowances ..	(18)	50.00	(28)
Out Freight ..	(19)	120.00	
Trading ..	(20)	12,450.40	
		13,485.60	13,485.60

SALES RETURNS.

17.

Accounts Receivable (28)		\$ c.	
	865.20	Sales ..	(16)
		865.20	

SALES ALLOWANCES.

18.

Accounts Receivable (28)		\$ c.	
	50.00	Sales	(16)
		50.00	

OUTBOUND FREIGHT.

19.

Accounts Payable (29)		\$ c.	
	120.00	Sales	(16)
	120.00		

TRADING.

20.

Cost of Sales .. (15)		\$ c.	
Reserve for Overhead (13)	180.11	Cost of Returns (15)	597.12
Profit and Loss (27)	4,056.88	Sales (16)	12,450.40
	73,047.52		73,047.52

SHIPPING.

21.

Labour .. (2)		\$ c.	
Building Expense (3)	50.86	Profit and Loss (27)	237.19
Insurance (5)	1.00		
Taxes (6)	1.25		
Depreciation (7)	8.33		
Repairs (8)	2.00		
Miscellaneous—			
Supplies (29)	50.00	Profit and Loss (27)	237.19
Expense (29)	6.75		
		237.19	237.19

SELLING EXPENSE.

22.

Salaries (29)		\$ c.	
Commissions (29)	200.00	Profit and Loss (27)	1,120.53
Advertising (29)	120.53	Profit and Loss (27)	1,120.53
	1,120.53		1,120.53

GENERAL EXPENSE.

23.

Building Expense (3)		\$ c.	
Insurance (4)	14.00	Profit and Loss (27)	1,180.67
Taxes (6)	16.75		
Depreciation (7)	8.33		
Officers' Salaries (29)	400.00	Profit and Loss (27)	1,180.67
Office Salaries (29)	300.00		
Delivery Expense (29)	186.43	Profit and Loss (27)	1,180.67
Miscellaneous Expense (29)	204.30		
	1,180.67	Profit and Loss (27)	1,180.67

DISCOUNT ON PURCHASES.

	\$ c.		\$ c.
Profit and Loss .. (27)	165.40	Accounts Payable (29)	165.40

DISCOUNT ON SALES.

	\$ c.		\$ c.
Accounts Receivable (28)	95.00	Profit and Loss (27)	95.00

RESERVE FOR BAD DEBTS.

	\$ c.		\$ c.
Accounts Receivable (28)	61.00	Balance ..	125.00
Balance	131.00	Profit and Loss (27)	70.00
	<u>195.00</u>		<u>195.00</u>
		Balance	131.00

PROFIT AND LOSS.

	\$ c.		\$ c.
Shipping .. (21)	237.19	Trading .. (20)	4,056.88
Selling .. (22)	1,120.53	Discount on Purchase (21)	165.10
General Expense (23)	1,180.67		
Discount on Sales (25)	95.00		
Reserve for Bad Debts (26)	70.00		
<i>Net Profit to Surplus (36)</i>	<u>1,518.89</u>		
	<u>4,222.28</u>		<u>4,222.28</u>

ACCOUNTS RECEIVABLE.

	\$ c.		\$ c.
Balance	6,000.00	Cash (30)	9,875.00
Sales (16)	13,485.60	Returns (17)	865.20
		Sale Allowances (18)	50.00
		Discount on Sales (25)	95.00
		Bad Debts .. (26)	64.00
		Balance	8,530.40
	<u>19,485.60</u>		<u>19,485.60</u>
Balance	<u>8,530.40</u>		

ACCOUNTS PAYABLE.

	\$ c.		\$ c.
Cash (30)	15,350.50	Balance	6,250.00
Discount on Purchases (24)	165.40	Accounts Payable Register	19,199.71
Balance	10,233.81		<u>25,749.71</u>
	<u>25,749.71</u>	Balance	<u>10,233.81</u>

CASH.

	\$ c.		\$ c.
Balance (30)	17,061.00	Accounts Payable (29)	15,350.50
Accounts Receivable (28)	9,875.00	Balance	11,585.50
	<u>26,936.00</u>		<u>26,936.00</u>
Balance	<u>11,585.50</u>		

LAND.

	\$ c.		\$ c.
Balance	4,000.00		

BUILDINGS.

	\$ c.		\$ c.
Balance	12,000.00		

MACHINERY AND EQUIPMENT.

	\$ c.		\$ c.
Balance	50,000.00		

CAPITAL STOCK.

	\$ c.		\$ c.
Balance	100,000.00		

UNISSUED STOCK.

	\$ c.		\$ c.
Balance	15,000.00		

SURPLUS.

	\$ c.		\$ c.
Balance	6,518.89	Profit and Loss (27)	1,518.89
	<u>6,518.89</u>		<u>6,518.89</u>

36.

TRIAL BALANCE (before closing) JANUARY 31ST 1916.

		\$ c.	\$ c.
1	Materials..	4,000.00	686.79
2	Labour ..		
3	Insurance ..	756.00	
4	Taxes ..	1,000.75	
5	Depreciation Reserve ..		1,568.74
6	Factory Overhead, Dept. A ..		84.32
7	" B ..	129.78	
8	" C ..	153.65	
9	Work in Process ..	4,024.86	
10	Finished Goods ..	7,635.72	
11	Sales ..		13,485.60
12	Sales Returns ..	865.20	
13	Sales Allowances ..	50.00	
14	Outbound Freight ..	120.00	
15	Trading ..	8,204.41	
16	Shipping ..	237.19	
17	Selling Expense ..	1,120.53	
18	General Expense ..	1,180.67	
19	Discount on Purchases ..		165.40
20	Discount on Sales ..	95.00	
21	Reserve for Bad Debts ..		61.00
22	Accounts Receivable ..	8,536.40	
23	Accounts Payable ..		10,233.81
24	Cash ..	11,585.50	
25	Land ..	4,000.00	
26	Buildings ..	12,000.00	
27	Machinery and Equipment ..	50,000.00	
28	Capital Stock ..		100,000.00
29	Unissued Stock ..	15,000.00	
30	Surplus ..		5,000.00
31		131,285.66	131,285.66

PROFIT AND LOSS STATEMENT FOR Month ENDING JANUARY 31 1916.

		\$ c.	\$ c.
Gross Sales ..	(16)		13,485.60
Sales Returns ..	(17)	865.20	
Sales Allowances ..	(18)	50.00	
Outbound Freight ..	(19)	120.00	
			1,035.20
Net Sales ..		12,450.40	
Cost of Sales ..	(20)	8,204.41	
Reserve for Overhead ..	(13)	180.11	
			8,393.52
Gross Profit ..		4,056.88	
Shipping ..	(21)	237.19	
Selling Expense ..	(22)	1,120.53	
General Expense ..	(23)	1,180.67	
Discount on Sales ..	(25)	95.00	
Bad Debts ..	(26)	70.00	
			2,703.39
Net Earnings ..		1,353.49	
Discount on Purchases ..	(24)	165.40	
Net Profit ..		1,528.89	

STATEMENT OF FACTORY OPERATIONS.

FOR THE MONTH ENDED 31ST JANUARY 1916.

Summary of Factory Operations.

Material—		
Inventory at 1st of Month ..	..	\$3,000.00
Purchases ..	..	7,800.00
Freight and Express In ..	..	284.32
Total ..	..	11,084.32
Less Inventory at end of Month ..	..	4,600.00
Direct Material Used ..	..	\$6,484.32
Direct Labour ..		4,444.67
Factory Overhead, per detail below :—		
Department A ..	..	1,207.34
" B ..	..	1,311.96
" C ..	..	662.07
Total Factory Overhead ..	..	3,182.00
Total Material, Labour, and Overhead ..		14,110.99
Add Inventory, 1st of Month :—		
Work in Process ..	..	2,000.00
Finished Goods ..	..	3,754.00
		5,754.00
Less: Inventory at End of Month :—		
Work in Process ..	..	4,024.86
Finished Goods ..	..	7,635.72
Cost of Sales, per Profit and Loss Statement ..		11,660.58
		8,204.41

SUMMARY OF FACTORY OVERHEAD.

Nature of Expense	Total	Department A	Department B	Department C
Building Expenses ..	\$ c. 330.50	\$ c. 101.72	\$ c. 127.15	\$ c. 101.72
Power ..	756.90	252.30	336.40	168.20
Depreciation ..	218.75	75.00	100.00	43.75
Insurance ..	35.00	12.00	16.00	7.00
Taxes ..	43.75	15.00	20.00	8.75
Shop Repairs ..	522.23	159.00	247.80	115.43
General Factory Expenses ..	467.99	155.90	207.77	104.30
Miscellaneous Supplies ..	90.00	30.00	40.00	20.00
Indirect Labour ..	683.40	240.50	251.20	185.70
Miscellaneous Expenses ..	222.50	75.60	85.40	61.50
Total ..	3,371.11	1,123.02	1,431.74	816.35
Adjustment in Department Overhead ..	189.11	84.32	119.78	153.65
Total Factory Overhead as above ..	3,182.00	1,038.70	1,311.96	662.70

BALANCE SHEET, 31ST JANUARY 1916.

Current Assets—		
Cash ..	(30)	\$11,585.50
Accounts Receivable ..	(28)	88,536.40
Less Reserve for Bad Debts	(26)	131.00
		8,405.40
Raw Materials ..	(1)	4,600.00
Work Process ..	(14)	4,024.86
Finished Goods ..	(15)	7,635.72
Total Current Assets ..	..	\$36,251.48
Deferred Assets—		
Prepaid Insurance ..	(5)	756.00
Prepaid Taxes ..	(6)	1,000.75
Total Deferred Assets ..	..	1,756.75
Capital Assets—		
Land ..	(31)	4,000.00
Buildings ..	(32)	12,000.00
Machinery and Equipment (33)		50,000.00
		62,000.00
Less Depreciation Reserve (7)	1,568.74	60,431.26
Total Capital Assets ..	..	64,431.26
Total Assets ..	..	<u>102,439.49</u>
Current Liabilities—		
Accounts Payable ..	(29)	10,233.81
Accrued Wages ..	(2)	686.79
Total Current Liabilities ..	..	10,920.60
Capital Liabilities—		
Capital Stock ..	(34)	100,000.00
Less Unissued Stock	(35)	15,000.00
Surplus ..	(36)	85,000.00
		5,000.00
Total Capital Liabilities ..	..	90,000.00
Net Profit for Month	..	1,518.89
		<u>\$102,439.49</u>

Uses and Advantages of a Cost System.

The prime object of a cost system is to determine costs, to analyse and compare them, and to use them as a basis for making prices. But the uses and advantages go further. A manufacturer from reliable records is able to make clearer and more intelligent statements to his bank and thereby obtain a larger line of credit than he could without them.

Better Direction of Sales Force.

In almost every line of manufacture there are some classes of work done on which the manufacturer loses money. This may be due to the high cost in his own plant, or it may be due to the fact that some competitor is better equipped to make that particular article. A cost system

will bring out these facts and will show the manufacturer which lines he should push. Salesmen, like everyone else, are prone to follow the line of least resistance. In salesmanship the line of least resistance is selling the goods which require the least effort, and in nearly every instance the goods which require the least effort to sell are the least profitable lines. If the selling force know that a line of goods produces little or no profit, and are told to use every effort to push another line, the result will be apparent in the Profit and Loss Account.

Still other manufacturers have customers on their books to whom they have been selling for years, and have been giving some reduction in price or some concession in the way of extra work. A number of these accounts are decidedly unprofitable, and a cost system will bring these to light and put the manufacturer either in a position to raise his prices to a profitable basis or let someone else have the unprofitable business.

Elimination of Waste.

In every manufacturing business there are bound to occur leaks, either of material, labour, or expense. If statistics are kept showing the amount of material necessary to do certain classes of work, the amount of labour, and the amount of overhead expense, an increase in any of these items will be revealed by a comparison, and the executive will be in a position to take the matter up for investigation. It is hardly necessary to say that after a few of these matters have been taken up with the factory the factory people will use a little more care, not only in the use of the material but in the time they spend on the work. A cost system with forms properly designed for giving statistical information is of the greatest aid to factory efficiency.

Cost System an Investment, not an Expense.

A system will not run itself; neither will it in itself reduce costs nor increase efficiency. This is strictly up to the manufacturer himself. A system will give him the information, and if this information is properly used, he will unquestionably find that his system is not an item of expense, but a very valuable asset.

If a manufacturer purchases a new machine before his old one is worn out, he does so because he expects the amount expended to increase his profits either from economy in operation or from an increase in production. He looks on this as an investment and not an expense. Office methods have been improved to quite as large an extent as machinery, and an investment in improved methods will produce a return just as will an investment in improved machinery.

INTENTIONAL SECOND EXPOSURE

40

BALANCE SHEET, 31ST JANUARY 1916.

Current Assets—		
Cash	.. (30)	\$11,585.50
Accounts Receivable .. (28)	88,536.40	
Less Reserve for Bad Debts (26)	131.00	
		8,405.40
Raw Materials .. (1)	4,600.00	
Work in Process .. (14)	4,024.86	
Finished Goods .. (15)	7,635.72	
Total Current Assets		\$36,251.48
Deferred Assets—		
Prepaid Insurance .. (5)	756.00	
Prepaid Taxes .. (6)	1,000.75	
Total Deferred Assets		1,756.75
Capital Assets—		
Land (31)	4,000.00	
Buildings (32)	12,000.00	
Machinery and Equipment (33)	50,000.00	
		62,000.00
Less Depreciation Reserve (7)	1,568.74	
		60,431.26
Total Capital Assets		64,131.26
Total Assets		<u>102,439.49</u>
Current Liabilities—		
Accounts Payable .. (29)	10,233.81	
Accrued Wages .. (2)	686.79	
		10,920.60
Total Current Liabilities		
Capital Liabilities—		
Capital Stock .. (34)	100,000.00	
Less Unissued Stock (35)	15,000.00	
		85,000.00
Surplus (36)	5,000.00	
Total Capital Liabilities		90,000.00
Net Profit for Month		<u>1,518.89</u>
		<u>102,439.49</u>

Uses and Advantages of a Cost System.

The prime object of a cost system is to determine costs, to analyse and compare them, and to use them as a basis for making prices. But the uses and advantages go further. A manufacturer from reliable records is able to make clearer and more intelligent statements to his bank and thereby obtain a larger line of credit than he could without them.

Better Direction of Sales Force.

In almost every line of manufacture there are some classes of work done on which the manufacturer loses money. This may be due to the high cost in his own plant, or it may be due to the fact that some competitor is better equipped to make that particular article. A cost system

41

will bring out these facts and will show the manufacturer which lines he should push. Salesmen, like everyone else, are prone to follow the line of least resistance. In salesmanship the line of least resistance is selling the goods which require the least effort, and in nearly every instance the goods which require the least effort to sell are the least profitable lines. If the selling force know that a line of goods produces little or no profit, and are told to use every effort to push another line, the result will be apparent in the Profit and Loss Account.

Still other manufacturers have customers on their books to whom they have been selling for years, and have been giving some reduction in price or some concession in the way of extra work. A number of these accounts are decidedly unprofitable, and a cost system will bring these to light and put the manufacturer either in a position to raise his prices to a profitable basis or let someone else have the unprofitable business.

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One of the strongest arguments in favour of installing a practical cost system is the fact that every manufacturer who has installed one and who has operated it for at least a year is firmly convinced that it is a paying proposition.

The Federal Trade Commission is urging manufacturers to give the subject of accurate costs the attention it deserves. It has found that unreliable costs of production and distribution cause a great deal of unfair competition and a heavy business death rate.

While the claim is not made that a cost system will save a man from failure, the claim is made that a man who knows where he stands day by day is very much less likely to make a failure of his business than one who is directing his business by guesswork.

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